

Grand Rapids Urban Tree Canopy Analysis

Introduction

Urban trees play an important role in our daily lives; they provide many economic, environmental, and social benefits and can have far-reaching effects on a community's quality of life. Trees reduce the urban heat island effect and help to cool the atmosphere, improve water quality, save energy, reduce storm-water flooding and damage, mitigate air pollution, enhance property values, provide wildlife habitat, provide educational opportunities, and provide psychological and aesthetic benefits for citizens. The amount of urban tree canopy (UTC) determines many of these economic, environmental, and social benefits.



i-Tree Canopy is a new tool that allows users to easily interpret Google Earth aerial imagery of their areas and produce statistical estimates of tress and other cover types along with calculations of the uncertainty of their estimates. This tool provides a quick, and inexpensive means for cities and forest managers to accurately estimate their tree cover.

Recognizing the importance of UTC, an i-Tree Canopy assessment was prepared for City of Grand Rapids, Michigan.

Canopy Goals

Quantifying UTC allows communities to establish baseline conditions for current use and future monitoring, benchmark against similar communities, set goals for improving tree canopy, and create plans for planting and protecting trees. UTC goal setting can be based on total canopy cover in relation to other land cover area totals. It is also important to consider the feasibility of increasing UTC given the difficulty of sustaining trees in urban situations. American Forests, a recognized leader in conservation and urban forestry, has established an average canopy goal of 40 percent for metropolitan areas. i-Tree Canopy provides communities with a cost effective means to begin urban forest improvement through setting urban tree canopy goals to increase and preserve their tree canopy.

i-Tree Canopy Project Configuration

The screenshot shows the i-Tree Canopy Project Configuration web interface. At the top, there's a navigation bar with buttons for Home, About, Applications, Utilities, Resources, Support, and News. To the right of the navigation bar are login fields for Username and Password, a Search button, and a Register button. Below the navigation bar is a section titled "i-Tree Canopy Configure Survey". Inside this section, there's a table with the following data:

	Cover Class	Abbreviation	Description	Show Estimation
1	Canopy	C	Tree/Shrubs	<input checked="" type="checkbox"/>
2	Impervious	I	Impermeable Surface	<input checked="" type="checkbox"/>
3	Pervious	P	Grass/Open Space	<input checked="" type="checkbox"/>
4	Bare Soils	B	Bare Ground	<input checked="" type="checkbox"/>
5	Open Water	W	Lake/Rivers/Streams/Ponds	<input checked="" type="checkbox"/>

At the bottom of the table, there's a "Done" button. The interface also includes a "Save" button, a "Load" button, and a "? Help" button.

Configuring i-Tree Canopy allows a customizable assessment of land cover classes. This flexibility allows communities to obtain results that reflect land use conditions within their community. Davey recommends a four cover class assessment composed of Canopy, Impervious, Pervious, and Open Water. An analysis of these cover classes provides the framework for urban tree canopy goal setting.

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Results

The city of Grand Rapids has an overall canopy of 26.9 percent which is well below the 40 percent urban tree canopy recommended by American Forests for cities east of the Mississippi River.

The resulting i-Tree Canopy analysis provides the framework to begin urban tree canopy goal setting. Canopy includes both public and private trees within the boundary of the assessment.

Land Cover	Percent Land Cover
Canopy	26.9%
Impervious	41.1%
Pervious	30.1%
Open Water	1.9%
Total	100%

Davey classified points utilizing Google Earth imagery and the aggregated results determine the total points within each land cover class and the total percent land cover.

Potential tree canopy for any community can be measured by totaling the existing canopy and all other viable planting areas. For this assessment pervious land cover was considered as viable planting areas. Impervious land cover can become part of the tree canopy if redesigned or retrofitted.

The UTC analysis revealed that potential canopy cover is 57.0 percent (canopy plus pervious land cover).

Next Steps

Once the extent of UTC has been realized, it is recommended communities take measures to maintain, increase, and preserve their tree canopy. Potential approaches include:

- Sharing results with community and stakeholders
- Comparing i-Tree Canopy results with other community UTC assessments
- Considering how UTC cover fits within community goals
- Deciding with stakeholders on how to implement UTC and tree planting initiatives
- Integrating i-Tree Canopy data with existing community greening/tree preservation initiatives
- Consider undertaking a conventional UTC or i-Tree Eco assessment to compare results and validate benefits associated with UTC



Canopy — is composed of the leaves, stems, and branches of all public and private trees as viewed from above.

Impervious — areas that do not allow rainfall to infiltrate and typically include roads, buildings, parking lots, and other paved surfaces that would benefit the most from additional trees and canopy cover.

Pervious — vegetated areas that allow rainfall to infiltrate and typically include parks, open areas, agriculture, bare soils, or golf courses and are places with the most potential for increasing the City's overall canopy.

Open Water — areas that are completely surrounded by water.



More Information: i-Tree — <http://www.itreetools.org/> USFS — <http://nrs.fs.fed.us/urban/utc/> Davey — <http://www.davey.com/>